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# Biotechnology Notes

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*Biotechnology Notes*, a compilation of agency activities, news events, and upcoming meetings, is prepared for members of the U.S. Department of Agriculture's (USDA) Committee on Biotechnology in Agriculture (CBA) by USDA's Office of Agricultural Biotechnology (OAB).

## INSIDE USDA

### IF IT DOESN'T MAKE "SENSE", YOU'RE DOING IT RIGHT

If your grocery store's tomatoes are either too hard or too soft, help may be on the way. Calgene Inc. has been issued a permit by the Animal and Plant Health Inspection Service (APHIS) to field test in Hawaii a genetically engineered tomato that will stay red, ripe, juicy, and firm long after being picked and shipped to your local supermarket.

The technique Calgene used is called anti-sense technology, and this is the first permit issued by APHIS for anti-sense work. A gene from a tomato cultivar was inserted into a tomato chromosome in reverse orientation (order). According to the laws of genetics, this arrangement would not make sense; hence, the name "anti-sense" technology. However, changing the genetic lineup inactivates the normal gene that plays a role in ripening tomatoes. Because the ripening process has been slowed down, the fruit doesn't have to be picked when it's still green.

The new vine-ripened tomatoes have a higher solid content, meaning they aren't mushy inside. As far as taste is concerned, the company expects its product to be as good as ever. To learn more about this field trial, call Dr. Arnold Foudin, Acting Deputy Director, Biotechnology Permit Unit, APHIS, (301) 436-5961.

### THE "YEA'S" HAVE IT

In a 12 to 0 vote, with one abstention, USDA's Agricultural Biotechnology Research Advisory Committee (ABRAC) said a field test conducted by Texas A&M University using an experimental vaccine for brucellosis can, under certain confinement conditions, be conducted safely. The ABRAC voted on this matter at its Jan. 5-6 meeting. Brucellosis is a bacterial disease that causes abortion in cattle and costs the country about \$50 million per year for eradication activities. An improved vaccine is needed because the one currently used causes a limited infection in cattle.

The ABRAC is a Federal advisory body of national experts that serves at the behest of the Secretary of Agriculture. Its recommendations are considered to weigh heavily in the decision-making process. The brucellosis proposal was the first to



come before the Committee for review and recommendation. According to Dr. Alvin Young, ABRAC Executive Secretary and Director of the Office of Agricultural Biotechnology (OAB), "This proposal stands as a model for other investigators who may be considering similar field tests. It is also a good example of how a very difficult problem was solved through a spirit of cooperation among USDA sister agencies, research institutions, and industry agricultural leaders."

Although Texas A&M volunteered to seek ABRAC's opinion on its proposal, the institution is still obligated to satisfy requirements from other agencies on issues related to animal health, human health, and the environment.

#### **TRANSGENIC ANIMALS: GROUP TACKLES BIG QUESTIONS**

Does the use of viral vectors raise unique concerns about infection, mutagenesis, or carcinogenicity? Do transgenic animals constitute a unique regulatory category as food animals or for the regulation of environmental release? These are a few of the scientific issues being discussed by the Food Animal Biotechnology Information Exchange Group.

The Group was organized by the the Food Safety and Inspection Service (FSIS) to coordinate interagency regulation of transgenic animals. Representatives from FSIS, APHIS, the Center for Veterinary Medicine (FDA), the Center for Food Safety and Applied Nutrition (FDA), the Environmental Protection Agency, and the OAB have been meeting for several months in an informal atmosphere exchanging views on common issues. If the Group finds an area that needs research or a written document, such a task will be assigned to a subcommittee drawn from the appropriate staffs.

#### **USING BIOTECHNOLOGY TO IMPROVE FOOD CROPS**

If the history of the automobile began with the invention of the wheel, then one might say the roots of modern day agricultural biotechnology started with basic research on microorganisms. Today, researchers are applying biotech techniques to ever more complex life forms. At the Agricultural Research Service's molecular biology laboratory in Beltsville, Md., a small team has succeeded in using an inhibitor selection technique to make rice more nutritious. Rice is the primary source of protein for most people in the world.

Lysine is an amino acid that is somewhat deficient in the major cereal crops. By increasing the lysine content, researchers knew they could increase the nutritional value of rice. To achieve their goal, the team put millions of rice cells in a petri dish and added inhibitors that interfered with the way lysine was synthesized. While the inhibitor succeeded in interrupting the way most cells synthesized lysine, other lysine-rich cells remained unaffected by the invaders. These were the cells the scientists were looking for.

The strong survivors were selected from the tissue culture and regenerated into plants. An analysis of the seeds indicated the potent lysine trait is inherited as a recessive gene, meaning there is a 25 percent chance that progeny will have it. An unexpected side effect, frequent infertility, has been lessened after several straight crosses and back crosses. More than 30 new lines of rice are now growing in greenhouses. The next step will be to conduct outdoor field trials, probably later this year.



## NEW GUIDELINES ENTER HOME STRETCH

Significant progress has been made in the past few months carving out guidelines researchers may use for ensuring safe field tests of biotechnological products and organisms. Comments from the last ABRAC meeting, held Jan. 5-6, have been added to the copy and a new draft mailed to members and alternates. If a majority of the committee supports the document, it will then go to the administrators of certain USDA agencies and their comments passed on to the ABRAC for resolution.

The amended draft will then be reviewed by the Biotechnology Science Coordinating Committee, an executive group that coordinates biotechnology policy among Federal agencies. The next step is review by the Office of Management and Budget and then publication in the Federal Register for public comment.

The guidelines represent USDA's effort in ensuring that research outside the laboratory is safe for human health and the environment. Specifically, they suggest which confinement measures (physical, biological, chemical) are best suited for certain projects using specific categories of organisms. The guidelines would apply to all USDA-funded research projects.

## CLIP AND SAVE

The ABRAC is scheduled to meet three more times this year — March 22-23, June 22-23, and September 21-22. All meetings will take place at USDA, 14th and Independence Ave., S.W., Administration Bldg, Washington, D.C. 20250. Specific times, room numbers, and agenda items are published about a month in advance in the Federal Register. In case you're not a subscriber, it may be best to confirm such details by calling OAB at (202) 447-9165.

## OAB WELCOMES BRITISH VISITOR

Transgenic animals and the international introduction of genetically manipulated organisms were a few of the topics discussed at a meeting Jan. 10 between Dr. J.F.A. Thomas, the U.K. coordinator for genetic engineering, and OAB Director and Deputy Director, Drs. Alvin Young and Daniel Jones. Dr. David MacKenzie, Director of the National Biological Impact Assessment Program (NBIAP) talked about organism-specific risk research. Ms. Martha Steinbock of the Office of International Cooperation and Development discussed possible international exchange programs. Dr. Thomas' visit concluded with a presentation by Ron Evans of the Environmental Protection Agency on its proposed rule for genetically modified organisms under the Toxic Substances Control Act.

## AROUND THE NATION (AND THE WORLD)

## GETTING THE MESSAGE ACROSS

The winter issue of Techne, a newsletter prepared by the North Carolina Biotechnology Center, describes a unique project aimed at informing different groups in the State about biotechnology. The project began last November with a survey that asked

each group what it knew and how it felt about agricultural biotechnology. The survey included 210 farmers from various counties, 160 rural non-farmers, 160 urban dwellers, and 250 agricultural leaders (ag extension personnel, representatives from industry, government, academia, civic organizations, the media, public interest groups, etc.). Results will be analyzed and the data used to help North Carolina agricultural extension agents design an effective education program on ag biotechnology. Information materials will be distributed sometime this summer.

#### FRANCE FIELD TESTS TOBACCO PLANTS

Tobacco plants genetically engineered to resist Basta, an herbicide manufactured by the German firm Hoechst, have been tested outdoors in France. Researchers have confirmed resistance in the field but need to conduct further studies to evaluate any environmental side effects. The research was conducted by Plant Genetic Systems, a European genetic engineering company, with support from the Institut National de la Recherche Agronomique and the Société pour l'Exploitation Industrielle du Tabac.

#### NATIONAL TELECONFERENCE ON AGRISCIENCE

On February 2 from 10 a.m. to 11.30 a.m. (CST), the Louisiana Educational Satellite Network, Bossier Community College, the USDA/University of Florida, and Kraft, Inc. will host a national interactive video teleconference for grades 6 through 12. The program will highlight areas of biogenetics, space agriculture hydroponics, and other types of experimental agriculture. For more information, call (318) 746-7754.

#### MONOCLONAL ANTIBODIES IMPROVE DISEASE DETECTION

Greening is a citrus tree disease that causes trees to wither and prevents fruit from ripening. Certain insects carry the harmful microbe that infects the tree's sap vessels. The disease is widespread in South Africa and throughout Asia and is threatening much of the Middle East and the Mediterranean Basin. Until recently, only electron microscopy could detect the bacteria. Now, commercial growers can detect the bacteria quickly and easily using a monoclonal reagent developed via techniques using monoclonal antibodies and immuno-enzymes. Researchers hope the use of monoclonal antibodies for detecting pathogenic agents leads to more effective disease prevention. The approach was developed by scientists at France's Institut National de la Recherche Agronomique.

#### NEW BIOTECH FACILITIES GOING UP

Three biotech facilities are now under construction. A \$10 million University of Texas Institute of Biotechnology at San Antonio, which will be donated to the University of Texas system, is funded with donations from H. Ross Perot and Houston Endowment Inc. At Iowa State University, construction on a \$30 million molecular biology building is underway. It's being funded by State, corporate, and private donations. Finally, construction has begun on laboratory and greenhouse space for new ag biotech research at the Samuel Roberts Noble Foundation, Ardmore, Okla.



## A YEAR IN REVIEW . . . THE 100TH CONGRESS

Congress had a busy year reviewing many biotechnology-related bills. Thanks to the Industrial Biotechnology Association, here's a quick scan at what happened to some of them.

S. 1988. "The Biotech Competitiveness Act." Would have created an advisory commission on biotech policy to recommend ways to keep the U.S. industry in the lead; a subsidiary panel on the human genome; another on ag biotechnology. Introduced by Sen. Lawton Chiles and Ted Kennedy. Passed the Senate (88-1); passed House Agriculture Committee; passed House Science, Space and Technology Committee; died in House Energy and Commerce Committee.

H.R. 3119/S. 2111. "Animal Patent Moratorium". Would amend U.S. code to prohibit patenting of genetically altered or modified animals for either two years or permanently. Introduced by Rep. Charlie Rose and Sen. Mark Hatfield. S. 2111 died in Senate Judiciary Committee. H.R. 3119 defeated in House Judiciary Committee by 22-10.

H.R. 4970. "The Transgenic Animals Patent Reform Act." Would change patent laws so farmers don't have to pay inventors of genetically engineered, patented farm animals. Introduced by Rep. Robert Kastenmeier. Passed House by voice vote; died in Senate Judiciary Committee.

H.R. 4782. "Commerce Appropriations." Included request for \$113.5 million for the Patent and Trademark Office to help with backlog of biotech applications. Introduced by Rep. Neal Smith; House/Senate conference committee agreed to \$109 million; signed by the President Oct. 1, 1988.

### IN CASE YOU WEREN'T THERE

- USDA's ABRAC members met Jan. 5-6 in Washington, D.C. Discussions focused on the recommendations of the Research Guidelines Working Group and the benefits of developing a matrix approach to classifying organisms and experiments. The Committee also voted on the first proposal it had been asked to review. (For details, see "The 'Yea's' Have It" on page 1 and "New Guidelines Enter Home Stretch" on page 3.)
- The minutes of two ABRAC working groups -- Definitions and Biocontainment -- are now off press. To receive a copy, free of charge, call OAB at (202) 447-9165.

### NEW PUBLICATIONS

Biotechnology for Crop Protection, edited by P. Hedin, J. Menn, and R. Hollingworth. Published by the American Chemical Society, 1988. ACS Symposium Series 379. \$89.95. To order, call 1-800-227-5558.

The Impact of Chemistry on Biotechnology: Multidisciplinary Discussions. Edited by M. Phillips, S. Shoemaker, R. Middlekauff, and R. Ottenbrite. ACS Symposium Series 362. Published by the American Chemical Society. 1988. \$79.95. To order, call 1-800-227-5558.

The Language of Biotechnology: A Dictionary of Terms, by J. Walker and M. Cox. Published by the American Chemical Society. 1988. \$49.95. To order, call 1-800-227-5558.

Human Gene Therapy, by Eve K. Nichols. An analysis of the sensitive issues surrounding the ethical, economic, and policy aspects of manipulating human genes. 1988. Harvard University Press. ISBN 0-674-41480-2. Paperback: \$9.95.

"Answers to Commonly Asked Questions About Biotechnology Regulation." Prepared by the Industrial Biotechnology Association. Call (202) 857-0244.

#### UPCOMING MEETINGS

Feb. 6-10: The Miami Biotechnology Winter Symposium. Miami, Fla. For more information, call 1-305-324-5665.

Feb. 12-16: Aquaculture '89; An Industry-Wide Trade Show. Los Angeles, Calif. Sponsored by the World Aquaculture Society. Call (415) 595-2704.

Feb. 16: "Tapping Foreign Markets." A biotechnology network breakfast sponsored by the Montgomery County, Maryland High Technology Council, Inc. Gaithersburg, Md. Call (301) 762-6325.

Feb. 19-24: Society for Range Management annual meeting. Billings, MT. OAB Director Dr. Alvin Young will discuss education/research/biotechnology initiatives. For more information, write to P.O. Box 1342, Billings, MT 59103.

Feb. 22-24: Dairy Manure Management International Symposium. Syracuse, N.Y. For more information, call the Northeast Regional Agricultural Engineering Service at (607) 255-7654.

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Mar. 1-2: "Biotechnology for Aerospace Applications." Symposium at the U.S. Air Force Academy. Colorado Springs, Colo. Contact: Ted Smith, Department of Biology, USAF Academy, Colorado Springs, Colo. 80840; or call (719) 472-2720.

Mar. 22-23: USDA's ABRAC Meeting. Washington, D.C. Items on agenda to include development of research guidelines and handbook for field testing. Call (202) 447-9165 for details.

Mar. 22-23: "Biotechnology and the Food Supply: Looking at Tough Issues." Sponsored by Public Voice. Washington, D.C. Call (202) 659-5930 for details.



Mar. 28-30: AgBiotech '89. International conference and exposition. Sponsored by Bio/Technology Magazine. Arlington, Va. For more information, call 1-800-243-3238, ext. 232.

Mar. 29-31: Third International ABC Biotechnology Meeting. Washington, D.C. Sponsored by the Association of Biotechnology Companies. Contact: Jean Mills at (202) 842-2229.

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Biotechnology Notes is written and edited by Marti Asner, a public affairs specialist on assignment to OAB. Suggestions for items to include in future issues are always appreciated and may be sent to: USDA/OAB, 14th and Independence Ave., S.W., Room 321-A, Administration Bldg., Washington, D.C. 20250; telephone (202) 447-9165.

